IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION FOR UNITED STATES PATENT

SYSTEMS, METHODS AND APPARATUSES FOR BROKERING DATA BETWEEN WIRELESS DEVICES AND DATA RENDERING DEVICES

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SYSTEMS, METHODS AND APPARATUSES FOR BROKERING DATA BETWEEN WIRELESS DEVICES AND DATA RENDERING DEVICES

This application claims priority to Provisional Patent Application, Serial No. 60/214,339, entitled "systems, methods and apparatuses for brokering data between wireless devices and data rendering devices," filed June 27, 2000.

Technical Field of the Invention

The present invention is generally related to wireless devices and the use and management of data retrieved over wireless networks. More particularly, the present invention is related to systems, methods and apparatus for brokering data between wireless devices and devices used for rendering data.

Background

As a result of increased competition and the ongoing convergence of voice and data networks, new solutions and services are becoming available in the wired and wireless communications fields. Third Generation communications technology (also referred to in the art as 3G or IMT-2000), for example, is currently expected to bring wireless communication users the next generation of wireless technology. 3G is characterized by high-speed, high-bandwidth services that will support a wide variety of wireless applications, including wireline quality voice and high-resolution video. 3G is an initiative of the International Telecommunication Union (ITU) that seeks to integrate the various satellite, terrestrial, fixed and mobile systems currently deployed and being developed under a single standard or family of standards to promote global communication service capabilities and interoperability after the year 2000.

"Data" is generally known to refer to information (written, electronic, spoken, seen). As used in the communications field, data generally refers to multimedia such as voice, textual, graphics and video information transportable, generally between terminals, throughout communications networks under standards, protocols and over equipment capable of supporting and managing such data (e.g., 3G, ANSI-41, GSM, SS7, SMPP, TCP, IP). Standards and protocols exist and continue to be developed to improve wireless data communications. For example, the Short Message Peer to Peer (SMPP) protocol is an open, industry standard protocol designed to provide a flexible data communications interface for the transfer of short message data between message centers (e.g., mail servers) and a Short Message Service (SMS) application systems, such as a Wireless Application Protocol (WAP) proxy server, Email gateway or other messaging gateways. General descriptions

and examples of wireless data communications and associated protocols can be found in: U.S. Patent 6,076,099 issued June 13, 2000 to Chen, et al. entitled "Method for configurable intelligent-agent-based wireless communication system"; U.S. Patent 6,026,119 issued February 15, 2000 to Funk, et al. entitled "Wireless packet data communication modem and method of use therein"; U.S. Patent 6,075,812 issued June 13, 2000 to Caferella, et al. entitled "High-data-rate wireless local-area network"; and U.S. Patent 6,058,106 issued May 2, 2000 to Cudak, et al. entitled "Network protocol method, access point device and peripheral devices for providing for an efficient centrally coordinated peer-to-peer wireless communications network."

Wireless telephony devices (generally referred to as mobile or cellular phones) are available that communicate in dual modes (compatible with both analog and digital wireless networks). Many wireless telephones are becoming "Web-enabled." Other wireless devices are being developed that transmit and receive digital data, such as Personal Digital Assistants ("PDAs", with similar devices being referred to as palm or pocket computers). Wireless networks are continuing to be expanded and integrated with new applications and services that are compatible with the growing number of wireless devices entering the marketplace. Wireless devices are generally known to utilize digital signal processors (DSPs), which are generally embedded in specialized microprocessors and perform mathematical operations on a data stream in "real time" to produce a second (modified) data stream.

Network interconnection (connecting one communications network with another) and interoperability (ability of a network to operate with other networks) are becoming even more robust and standardized methodologies in the communications industry. An Integrated Digital Enhanced Network (IDEN) is an example of an enhanced specialized mobile radio network and technology

that combines two-way radio, telephone, text messaging and data transmission into one network, reflecting the ease of interconnection between networks. General Packet Radio Services (GPRS) data transmission technology is optimized for "bursty" datacom services such as wireless Internet/intranet and multimedia services. Also referred to as GSM-IP, it enables the connection of wireless device users directly to Internet Service Providers (ISPs). Another complementary service is High Speed Circuit Switched Data (HSCSD), which is well suited for real-time services and transferring larger amounts of data, such as video-based services. Into the GPRS solution has been introduced two new network nodes - the SGSN and the CGSN. SGSN tracks packet capable mobile locations, performs security function and access control. GGSN interfaces with external packet data networks to provide the routing destination for data to be delivered to a wireless device and to send mobile-originated data to its intended destination. The GGSN is connected with SGSNs via an IP-based GPRS backbone network. The obvious trend for the wireless industry is towards an all-IP platform, which unites different standards for wireless services worldwide, and introduces and open, Internet-based platform for integrated data, voice and video services over cellular networks.

Wireless Intelligent Networks (WIN) are generally known as the architecture of the wireless switched network that allows carriers to provide enhanced and customized services for mobile telephones. Intelligent wireless networks generally include the use of mobile switching centers (MSCs) having access to network servers and databases such as Home Location Registers (HLRs) and Visiting Location Registers (VLRs), for providing applications and data to networks, service providers and service subscribers (wireless device users). Local number portability allows wireless subscribers to make and receive calls anywhere, regardless of their local calling area. Roaming

subscribers are also able to receive more services, such as call waiting, three-way calling and call forwarding. A HLR is a database that contains semi-permanent mobile subscriber (wireless device user) information for wireless carriers' entire subscriber base. HLR subscriber information includes identity, service subscription information, location information (the identity of the currently serving VLR to enable routing of communications), service restrictions and supplementary services/information. HLRs handle SS7 transactions in cooperation with Mobile Switching Centers and VLR nodes, which request information from the HLR or update the information contained within the HLR. The HLR also initiates transactions with VLRs to complete incoming calls and update subscriber data. Traditional wireless network design is based on the utilization of a single HLR for each wireless network, but growth considerations are prompting carriers to consider multiple HLR topologies. The VLR is also a database that contains temporary information concerning the mobile subscribers currently located in a given MSC serving area, but whose HLR is elsewhere. When a mobile subscriber roams away from the HLR location into a remote location, SS7 messages are used to obtain information about the subscriber from the HLR, and to create a temporary record for the subscriber in the VLR. Signaling System No. 7 (referred to as SS7 or C7) is a global standard for telecommunications. In the past the SS7 standard has defined the procedures and protocol by which network elements in the public switched telephone network (PSTN) exchange information over a digital signaling network to effect wireless and wireline call setup, routing, control, services, enhanced features and secure communications.

Wireless location based services now being deployed on wireless networks enable wireless service providers to utilize information regarding the geographic location of wireless devices/callers

to provide public safety (e.g., E-911), location-sensitive billing, location-specific information (e.g., advertising) and tracking services. For example, automatic number identification (ANI) and automatic location information (ALI) of a wireless phone is being used together with user location information when a wireless telephone user contacts a 911call center. With the combination of Global Positioning System (GPS) and HLR technology, user identification and location information makes it easier and faster for police and rescue services to locate someone in distress who is calling from a wireless phone. GPS canbe incorporated into wireless systems for use in applications such as personal tracking, navigation and automatic vehicle location technologies. GPS application to wireless devices is generally described in U.S. Patent 6,075,987 issued June 13, 2000 to Camp, Jr. et al. entitled " Stand alone global positioning system (GPS) and method with high sensitivity" and U.S. Patent 6,073,013 issued June 6, 2000 to Agre, et al. entitled "Method and apparatus for performing position-based call processing in a mobile telephone system."

Enhanced messaging applications have also been developed in response to the convergence of voice and data networks and improving wireless technology. Unified Messaging solutions allow carriers and Internet service providers to manage customer e-mail, voice messages and fax images and can facilitate delivery of these communications to PDAs, telephony devices, pagers, personal computers and other capable information retrieval devices, wired or wireless. Improved operating systems and protocols allow Graphical User Interfaces (GUIs) to provide an environment that displays user options (e.g., graphical symbols, icons or photographs) on a wireless device's screen. Extensible Markup Language ("XML") is a currently available standard that performs as a universal language for data, making documents more interchangeable. XML allows information to be used in

a variety of formats for different devices, including PCs, PDAs and web-enabled mobile phones. XML enables documents to be exchanged even where the documents were created and/or are generally used by different software applications. XML has been shown to effectively enables one system to translate data that another systems sends. As a result of data transfer improvements, wireless device GUIs are becoming able to render images that closely represent the imaging capabilities available on desktop computing devices. Some examples of other data transmission and formatting systems and methods are generally described in U.S. Patent 6,021,433 issued February 1, 2000 to Payne, et al. entitled "System and method for transmission of data" and U.S. Patent 6,055,229 issued April 25, 2000 to Dorenbosch, et al. entitled "Method and apparatus in a wireless communication system for dynamically formatting application data to be transmitted."

Security of data during its transmission over wireless devices has become a growing concern. Improved encryption and user verification technologies enhance fraud prevention with respect to data transmission over networks. A general description of one recent communication security technology is provided in U.S. Patent 6,076,167 issued June 13, 2000 to Borza entitled "Method and system for improving security in network applications."

Other examples of advancements within the field of wireless communications include the following: The Wireless Internet is generally known as an RF-based service that provides access to the Internet, e-mail and/or the World Wide Web via wireless devices. Wireless Internet access is generally described in U.S. Patent 6,058,422 issued May 2, 2000 to Ayanoglu, et al. entitled "Wireless Internet access system." Wireless IP generally refers to the packet data protocol standard for sending wireless data over the Internet. Wireless LANs (Local Area Networks) are known to

utilize wireless transmissions, such as radio or infrared communication instead of phone lines or fiber-optic cable, to connect to data devices. A Wireless PBX is a combination of equipment that allows employees or customers within a building or limited area to use wireless handsets connected to an office's private branch exchange system. Some other developments and observations regarding wireless data communications are described in U.S. Patent 6,069,896, issued May 30, 2000, to Borgstahl, et al. entitled "Capability addressable network and method therefor."

Brief Summary of the Invention

Although wireless device users are being provided with growing services, applications and multimedia support via access to numerous data networks (wired and wireless), solutions for rendering data provided by, or otherwise retrieved through, networks using wireless apparatuses are limited. Wireless device users are generally restricted in data use by small device-based viewers, limited GUI functionality and unavailable or inconveniently located rendering (e.g., printing/display/retrieval) resources to utilize data retrieved through networks. A wireless device user is generally required to wait until access to a network via "wired" or "fixed" devices having dedicated rendering peripherals and systems (e.g., personal computer with printing and display capabilities) are available -- where the location of the peripheral is already generally known to the user. For the remote wireless device user (such as business travelers), convenience and time are important considerations in choosing data rendering means and methods. Oftentimes, wireless device users are forced by circumstance to rely on limited or inconvenient rendering systems and methods (e.g., the personal computer), or to forego rendering plans altogether because of the current state of the art.

What is apparently needed as a result of increased public reliance on wireless data services and the desire for "information on the go" are new and improved systems, methods and apparatuses for rendering data retrieved through/with wireless devices. It is believed that various aspects and features of the present invention will address some of the developing needs of the wireless communication industry. It is therefore an object of the present invention to provide methods, systems and apparatuses for data brokering between wireless devices (WDs) and Data Rendering

Devices (DRDs).

DRDs can generally be considered "undedicated" rendering devices (e.g., "unassigned" as a resource and/or generally available and open to the acceptance and rendering of data from unfamiliar users). DRDs canbe located generally throughout an enterprise or private campus, or be distributed throughout communities for accessibility by the public. It is an advantage of the present invention for DRDs to be made publically available and easy to locate.

In accordance with an feature of the present invention, DRDs can receive data directly from WDs and/or through networks after/with coordination by WDs with networks providing data to DRDs.

In accordance with another feature of the present invention, DRDs can be adapted for facilitating direct wireless communication with a WD utilizing IR and/or RF communication signaling.

In accordance with another feature of the present invention, the DRD methods can be included in DRD adapted/network-enabled Kiosks, printers, photocopiers, ATMs, telephony, video monitors, conferencing and other multimedia-enabled devices.

In accordance with another feature of the present invention, a WD can be used to locate a DRD based on a WD and/or WD user's location and/or profile.

In accordance with another feature of the present invention, profile information can be provided by the WD and/or a network server.

In accordance with another feature of the present invention, user/WD location information and/or profile information can be determined/provided via networks in communication with a

user/WD, and DRD location information can be provided to user/WD via the networks based on user/WD location and/or profile.

Another feature of the present invention allows the network to verify DRD availability (e.g., operational readiness).

Another feature of the present invention can provide users with passcode protected retrieval of data from the DRD. Passcode capabilities can include the use of passwords/passcodes, biometrics and/or communications security (COMSEC).

Another feature of the invention provides for temporary memory at DRDs for storing rendering data. Temporary memory can be cleared/zeroed to irreversibly purge data from DRDs after use.

Another feature of the present invention provides simultaneous display of data at DRDs and WDs.

In accordance with another feature of the present invention simultaneous display of data can be provided at a DRD by more than one WD.

In accordance with another feature of the present invention, manipulation of data displayed on a DRD is carried out by at least one WD.

In accordance with another feature of the present invention, a WD can be programmed with IR and/or RF signals and/or associated functionality.

Another feature of the present invention provides more than one transmitting/receiving capability at WDs to enable simultaneous data retrieval from networks and/or DRD communication with WDs.

Another feature of the present invention provides payment/billing methods and systems associated with use of DRDs.

Another feature of the present invention enables more than one WD user to interact with a DRD simultaneously, wherein dedicated computing capability enables multiple WD users to interact with each other and/or displayed data and/or project independent data.

The novel features of the present invention will become apparent to those of skill in the relevant art upon examination of the following detailed description of the invention or can be learned by practice of the present invention. It should be understood, however, that the detailed description of the invention and the specific examples presented, while indicating certain embodiments of the present invention, are provided for illustration purposes only because various changes and modifications within the scope of the invention will become apparent to those of skill in the relevant art from the detailed description of the invention and claims that follow.

Brief Description of the Drawings

The accompanying figures, in which like references numerals may refer to identical or functionally-similar elements throughout the separate views are incorporated in and form part of the specification, further illustrate aspects of the present invention and, together with the detailed description of the invention, serve to better explain the principles of, but are not intended to limit, the present invention.

FIG. 1 is an exemplary illustration of an environment wherein aspects of the invention described herein can be deployed;

FIG. 2 is a block diagram illustrating components that can be included in a data rendering device (DRD) in accordance with aspects of the present invention;

FIG. 3 is a block diagram illustrating components that can be included in a wireless device (WD) in accordance with aspects of the present invention;

FIG. 4 is a flow diagram illustrating steps by a WD for selecting and providing data to a DRD;

FIG. 5 is a flow diagram illustrating additional steps of a WD for providing data to a DRD for rendering by the DRD;

FIG. 6 is a flow diagram illustrating steps by a WD for selecting a DRD for transfer of data;

FIG. 7 is a flow diagram illustrating steps by a WD for selecting a DRD using network resources, selecting data for transfer to/rendering by a selected DRD and requesting data transfer/render to the selected DRD;

FIG. 8 is a flow diagram illustrating steps for a WD/user to select a DRD for data transfer

via a network and selecting render functions at a DRD;

FIG. 9 is a flow diagram illustrating steps by a network server in processing a request for DRD location information;

FIG. 10 is a flow diagram illustrating steps by a WD for requesting DRD location information, data transfer and data rendering;

FIG. 11 is a flow diagram illustrating steps by a DRD for receiving/rendering data at the request of a WD; and

FIG. 12 is a flow diagram illustrating approval determination steps by a DRD.

Detailed Description of Preferred Embodiments

Particular configurations discussed in these non-limiting examples can be varied and are cited merely to illustrate at least one preferred embodiment of the present invention and are not intended to limit the scope of the invention.

In accordance with the following disclosure of the present invention, data generally refers to text, voice, graphics and/or video. Data rendering generally refers to the printing, displaying and/or retrieval of data. Wireless Devices (WD) include mobile phones, PDAs, pagers and other hand held wireless appliances adapted for connectivity to wireless networks and capable of processing data. A Data Rendering Device (DRD) includes data rendering hardware (e.g., printers, copiers, displays, etc.) and multimedia software adapted for rendering data at the request and/or coordination of what can be a previously unknown WD. DRDs can receive data directly from WDS and/or through networks (e.g., wireless, Internet, intranet, etc.) after/with coordination by WDS with networks providing data and support to DRDs. Data Brokering includes the negotiation, management, coordination and/or facilitation of data movement and use between and throughout DRDs, WDS and networks.

Referring to Figure 1, an environment is illustrated as an example wherein aspects of the invention described herein can be deployed. An aspect of the present invention provides methods, systems and apparatuses for data brokering between wireless devices (WDS) 6 and Data Rendering Devices (DRDs) 7. Data brokering can be carried out directly between WDS 6 and DRDs 7 via local wireless communications including infrared (IR) or radio frequency (RF) technology and/or indirectly via networks 12 through the use of known networking and data formatting protocols.

Information related to WDS 6, DRDs 7 and/or WD user's (e.g., subscriber identification, location, accounting, profiles) can be managed by a combination of network servers 15, Home Location Registers (HLRs) 16 and Visiting Location Registers 19. Subscriber information for a WD user can be kept in at least one HLR 13 and/or VLR 19, but can also be generated by the WD 6 (e.g., stored in the WD or provided together with a network request by WD user). Subscriber information can include a profile regarding DRD usage (e.g., restriction regarding geography, hardware capabilities, security, biometrics, etc). A WD 6 user is typically in communication with a supporting network 12 through wireless network communications hardware such as cellular antennas 16, Base Station Controllers (BSCs) 17 and Mobile System Controller (MSCs) 18. A copy of a WD 6 user's subscription information can be kept in a VLR 19 associated with the area and MSC 18 the user is operating during communication. Satellite global positioning system (GPS) 9 capabilities installed at the wireless network interface can assist in determining a WD 6 user's location by routing location information to the VLR19 /HLR 13 when a WD user communicates with a supporting wireless network 12. A WD 6 user will generally retrieve data from multimedia database resources 8 available or accessible to the WD and WD user over networks 12. Examples of multimedia resources include messaging mailboxes and Internet/intranet information.

In accordance with another aspect of the present invention data brokering can be accomplished directly between WDs and DRDs (e.g., locally via infrared (IR) or radio frequency (RF) technology) or can be negotiated with and provided through networks using available networking protocols. Referring to Figure 2, a block diagram of some of the components that can be included in a DRD 7 is provided. A DRD 7, serving as an apparatus adapted for rendering data

associated with a data rendering request issued by a WD 6, includes an authorization module 21, communications means 23, rendering means 25, and a microprocessor 24. The authorization module 21 approves receipt of rendering data in accordance with a request initiated by a WD 6. The authorization module 21 can approve or deny the request to render data based on the DRDs 7 readiness status 27. A status monitor 27 can be provided to track the operational readiness of the rendering means 25 (which can include printing, display and retrieval hardware status, and microprocessor 24 load/communications activity). The communications means 23 can provide a DRD 7 with wired and/or wireless communications with networks 28 and/or wireless devices (as generally described and illustrated in Figure 1 and as further known in the wireless communications art). Wired communication via communications means 23 can occur through known data network communications hardware, methods and protocols (e.g., cable modems, Ethernet, Bluetooth, etc.). Wireless communication via communications means 23 can occur through known wireless data network communications hardware, methods and protocols (e.g., Bluetooth, WLAN, 802.11b, etc.).

The network communications means 28 can provide DRD 7 communication capabilities over, for example, the public service telephone network (PSTN), digital subscriber line (DSL), Integrated Services for Digital Networks (ISDN) and/or Local Area Network (LAN). A DRD 7 can also communicate with networks via wireless means (e.g., cellular, satellite, microwave, etc.) A user's direct interaction with a DRD 7 can be provided through a user interface (UI) 22 associated with the DRD 7. The UI 22 can allow users to control (e.g., manage) and manipulate (e.g., interact with) data at the DRD 7. The UI 22 can be used to provide user passcodes (including biometrics) directly to the DRD 6 in order to receive rendered data from the DRD 7. Alternatively, a user can interact

directly with the DRD 7 via a WD 6. A WD 6 can provide commands and/receive data from the DRD 7 through IR and RF means. IR and RF data transport and communication hardware and protocols are known in the art and can be used for local communication between WDS 6 and DRDs 7. Memory 30 is also available at the DRD 7 to store applications, data, DRD profile information, passcode-related tools and other information and tools necessary for the DRD 7 to operate and communicate. The microprocessor 24 provides management and control over the DRD 6 and its components. Management and control over the DRD 7 and data can be through the UI 22 and/or WD 6.

DRDs 7 can be easily locatable using network 28 resources and /or WDs 6. Information related to a DRD's physical location and rendering capabilities, for example, can be registered at network 28 resources (e.g., an HLR) supporting network communication with the DRD 7. DRD information regarding capabilities can also be held within DRD memory 30 for retrieval by the network and/or WD 6. In accordance with this aspect of the present invention, WD proximity-based DRD locating/finding technology should enable WD users to locate available DRDs 7 based on a DRD's 7 proximity to the a roaming WD's location (e.g., determinable by GPS) and/or profile information. Profile information related to the DRD 20 can be provided from memory 30 at the DRD 20 and/or through the network 28. User/WD 6 location information can be determined via networks in communication with the user's WD 6. The user can choose to render data at the DRD 7 suggested by the network. Several DRDs can be identified by the network 28 for selection by the WD user. DRD brokering and location functionality can be included in familiar rendering devices (e.g., Internet Kiosks, printers, photocopiers, fax machines, automatic teller machines (ATMs), video

monitors, conferencing other multimedia-enabled devices) that are IR, RF and/or network communication enabled. DRDs can be public or exclusive to an enterprise. Other DRD compatible devices are foreseeable given the various aspects of the present invention taught herein.

A block diagram of some of the components that can be included in a WD 6 are illustrated in Figure 3. Referring to Figure 3, a WD 6 will include a communications means 31, microprocessor 35, and memory 36. The communications means can include IR 32, RF 33 and mobile network RF communications modules 34. The WD 6 can have a broad RF 33 and/or IR 32 signal recording/learning capabilities under the control of the microprocessor 35 utilizing the WD memory 36 for signal storage. The WD can be programmed/provided with unique control functions and/or signals applicable to a particular DRD 7 selected for use by the WD 6. Control functions can be recorded by the WD 6 memory 36 after being obtained by the communications means 31. A WD 6 can be provided with unique DRD control signals from the network or by requesting a temporary copy of DRD 7 control functionality directly from the DRD 7, in which case the DRD 7 can upload, via IR or RF communication, a copy of DRD programmable functions to the WD. It would be desirable for basic DRD functions and signaling to become standardize so that WDS and DRDs can interact with ease. WD and DRD location information can be coordinated/facilitated with the assistance of a locator module 37. The locator module 37 can be used to incorporate device-based GPS resources and/or to store locator programs and functions. The memory 36 can be used to store, for example, data, profile information, passcode information (including COMSEC) and programmable functions associated with IR and RF control over and communication with remote controlled devices (in addition to the DRD).

In addition to memorizing DRD 7 control signals and functions, a WD 6 having signal recording capabilities can be programmable to facilitate user control over other devices having wireless remote control capabilities. A WD 6 can learn device signals and functions associated with controlled devices by being programmed with applicable remote control signals. RF/IR signals can be learned and stored in WD memory and associated functionality can be assigned to optional/additional WD menu functions or UI controls. A WD can thereby be adapted to communicate with diverse remote controlled devices (e.g., secured entry (garage doors, gates, etc.), entertainment devices (games, TV, audio) and alarm control (home, vehicle).

Another aspect of the present invention can provide users with passcode protected retrieval of data from the DRD 7. The passcode, can be provided to the DRD 7 prior to data rendering and/or retrieval from the network 28. The authorization module 21 can facilitate passcode interaction at the DRD 20. A user can provide passcode information at the UI 22 and/or through a WD 6. The passcode can be verified at the network 28 (e.g., HLR) or by the DRD 7 (e.g., referencing DRD memory 20). Passcode information and verification can include the use of biometrics (e.g., voice, retinal, fingerprint) and/or communication security (COMSEC) methods. Passcode control can also be provided over use of the WD 6. For example, a passcode can be required before a WD user can use the WD to communicate with and control diverse remote controlled devices as described above (e.g., controlling security alarms and secured entry devices).

Referring again to Figure 2, a temporary memory 20 can be located at the DRD as a means for providing additional dedicated security over user data. The temporary memory 20 can be used for temporary storage of user data provided to the DRD 7 for rendering on behalf of the WD user.

The memory 20 holding the data can be permanently cleared of the data (also referred to "zeroing" the memory) through methods known in the art (e.g., electrical potential used to clear electronic memory registers). Zeroing the memory will ensure that data can not be reused by a subsequent user of the DRD. Memory 20 can be cleared upon: termination of use by the user, after a period of time (e.g., based on failure to render data or log-off) and/or upon user selection of a memory clearing operation at the DRD.

Methods of communications security (COMSEC) can also be incorporated into the DRD 7 to provide secure retrieval/use of data. Using encryption/decryption (also referred to as cryptography or "Crypto") methods, a user can be required to provide a DRD 7 with decryption codes to render data. Encryption/decryption coding can be provided by the network 28 (service provider) with data being transmitted at the request of the WD 6. The network 28 can generate data in encrypted form and provide the encrypted data to the DRD 7 through the network 28. The network can also provide the WD 6 (e.g., can be stored in WD memory 36) with decryption codes needed to render encrypted data at the DRD 7. The user can transmit decryption codes to the DRD 7 directly via the WD 6 (e.g., IR or RF transmission).

Another aspect of the present invention provides simultaneous display of data at DRDs and WDs. Such capability can be most relevant where WDs and DRDs possess compatible display technologies. In accordance with simultaneous display, another aspect of the present invention enables WD 6 control and/or manipulation of data displayed on a DRD 7. WD 6 control can be provided via IR/RF communication with a DRD. The WD 6 can host the networks retrieval of data for redisplay on DRD 7 via simultaneous WD-DRD communication (e.g., IR and/or additional RF

capacity) and/or WD-network communication via cellular RF capability. Simultaneous network and DRD communication by the WD 6 would be possible where more than one RF transmitter/receiving capability can be provided with the WD 6 (as shown in Figure 3).

Another aspect of the present invention provides a payment mechanisms and/or billing methods associated with DRDs. Payment mechanisms can be incorporated at the DRD 7 and managed by the microprocessor 24 and authorization module 21. A DRD 7 can accept currency and/or provide for electronic debits (e.g., e-money, account debits, etc.) through the payment mechanism. For example, an ATM machine can provide DRD capabilities and allow users to be billed a transaction fee via bank account cards (e.g., ATM, Debit and Credit cards). Another public device that can provide DRD capabilities are public telephones, which can allow users to make rendering related transaction payments via payment mechanisms or be billed via communication service accounts or arrangements. The DRD can also authorize operations through billing arrangements (e.g., prepaid services). DRD services/capabilities do not have to be billed to a WD/DRD user in company environments where the users and/or WD is recognized, by the network and/or DRD, as a authorized member of an organization. A example of a device that is generally available throughout large organizations and that can be suitable for DRD applications is a photocopier.

Another aspect of the present invention can enable office hardware such as photocopiers, printers, PCs, monitors, multimedia projectors, and TV monitors to be incorporated with DRD methodologies described herein. For example, presentation projectors typically used in conference room scenarios are already generally capable of being connected to laptops for the purpose of

displaying electronic information. DRD compatible software and hardware can be integrated within and/or connected to a multimedia projector to enable a WD to display data via the projector. Another aspect of the presentation in such a setting would allow several WD users to interact with the DRD simultaneously. Simultaneous, multi-WD user interaction together with dedicated computing capability can enable conference participants to interact with each other and displayed data and/or project independent data for comment by participants. In accordance with another aspect of the present invention, computing capability necessary to host a multi-WD user session with a DRD can be provided via networked or dedicated DRD processing capabilities (e.g., a host computer or network connection to the DRD) or via a user's WD acting as the host of the multi-WD session. The host could generally be responsible for presenting the data (e.g., the image of interest to the audience) and selectively archiving participant changes and/or multi-WD interaction with the data.

In accordance with aspects of using the present invention methods of use will now be described. Referring to Figure 4, a WD user can generally render data at an unassigned DRD by selecting data for rendering using a WD 41 (e.g., through the WDs associated UI). Once data has been selected, the user issues a command at the WD to provide data 42 to the DRD. Data can be provided directly to the DRD by the WD, or via a network supporting the WD.

Referring to Figure 5, when a WD is providing data directly to a DRD (e.g., via IR or RF communications) some additional steps can be required by the WD prior to providing data to the DRD. After the user selects data at the WD 51, but before data is provided to the DRD 53 at the direction of the WD, the WD achieves communication with the DRD 52. Once communication has been established 52, the WD provides the DRD with data 53. The DRD can verify to the WD 54

that it received the data. The DRD then renders the data 55 after it is received (generally at the command of the user).

A WD user can generally invoke the services of any DRD, public or private, using methods of WD, DRD and Network interaction further described below. A WD user can render the data directly at the DRD if its location is known to the user, or the user can request networks in communication with the WD for assistance in locating an appropriate DRD. DRD location can be based on the user's location or proximity to DRDs (known or determinable by the network or WD) and/or can be based on user requirements provided to the network or embodied in a WD user profile.

Referring to Figure 6, a user selects data for rendering at a WD 61. If the user does not know the location of a DRD, the user can request network assistance in identifying the location and/or capabilities of a DRD 62. Once an acceptable DRD has been selected, the user can request the network to transfer the data to the DRD 63. Referring to Figure 7, the WD can first be used by the WD user to request network assistance in locating an appropriate DRD 71. After the DRD has been located 71, data for rendering can be selected at the WD 72 and the network requested to transfer the data to the DRD 73.

Prior to actual transmission of data to the DRD, the DRD can require security passcode (e.g., including any of: passcode, biometrics and/or COMSEC) for transfer and rendering to occur. The WD device user can provide the passcode at the DRD's physical location prior to data transfer and rendering. Referring to Figure 8, data is selected at the WD for transfer to a DRD via networking 81. Data is then transferrable to the DRD via network 82. Although data can be transferred and eventually rendered at the DRD 84 without a passcode, a passcode can be required 83. The passcode

can be entered at the DRD prior to data transfer 82, or prior to data rendering 84 at the DRD. If a passcode is required, data will be rendered by the DRD 85 after the passcode has been entered. The passcode can be entered using a DRD user interface or via direct (local) communication to the DRD by the WD.

When the network is requested to assist the WD in locating a DRD, the network can select a DRD for the WD based only on the WDs proximity to the DRD. The network, however, can utilize more than just a WD x, y location within a geographic region based on GPS to find an appropriate DRD for the WD. DRD selection can be based on a profile. Referring to Figure 9, a network server can receive a request from a WD for DRD location based on a profile 91. Profile information can be located in a database (HLR) accessible to the server and/or transferred by the WD as part of the request for assistance. The profile can include new requirements issued by the user regarding locating an appropriate DRD. After the server receives the request, the server locates and identifies a DRD to the WD matching the profile 92. The server sends DRD location information to the WD 93. DRD location information can include address information, driving directions and/or a map. Such information is already available from some Internet websites providing directions/maps. With the present invention, however, the user does not have to provide known WD location information. The server can utilize WD location information known by the server (e.g., based on GPS) to generate directions and/or maps provided to the WD to locate the appropriate DRD.

Referring to Figure 10, a flow diagram of DRD location and data delivery is illustrated. At the WD the user wanting to render data at a DRD can request the network to find a DRDs location 101. A network server will assist the WD as provided in Figure 9. The WD will receive DRD

location information provided by the network 102. After DRD location is determined, the WD can have data delivered to the DRD either: directly from the WD 103 after physically locating the DRD, or via a request for data delivery through the network 104. If data is provided directly from the WD to the DRD, data can be rendered by the DRD 107 after receiving the data transferred by the WD. If data delivery through the network 104 is chosen, the WD/user can be required to enter a passcode to the DRD 105 prior to receiving data delivery at the DRD 104 and/or prior to requesting rendering to the DRD 106. After the rendering request is provided 106, and appropriate passcode authorization received 105 (if applicable), the DRD renders the data 107.

Referring to Figure 11, The DRD can be required to verify/authorize data receipt and/or rendering. The request for data receipt and/or rendering can be initiated by the WD/user at the DRD 111. The DRD can request the WD/user to enter a passcode 113 either before the DRD receives data 112, or before data is requested by the WD/user to be rendered by the DRD 114.

Although a DRD may seem appropriate for temporary assignment to the WD/user for data rendering because of its proximity to and/or profile match with the WD/user, it may not be available for rendering. For example, a DRD may not be available for rendering because it is out of service or has already reached its schedules/queued/potential capacity for data delivery/rendering based on a report by dedicated status monitoring means at the DRD. Referring to Figure 12, a DRD receives a network request for the DRD to receive/render data 121 associated with a WD. The DRD will verify its availability and either approve or deny delivery 122. If delivery is denied, a rejection is provided to the network 123 (e.g., to the requesting server). If the DRD accepts delivery/rendering an approval is sent to the network 124. The network can then send data to be received by the DRD 125.

The DRD can then render the data in accordance with other described methods.

The embodiments and examples set forth herein are presented to best explain the present invention and its practical application and to thereby enable those skilled in the relevant art to make and utilize the invention. The skilled in the art, however, should recognize that the foregoing description and examples have been presented for the purpose of illustration and example only. Other variations and modifications of the present invention will be apparent to those of skill in the art, and it is the intent of the appended claims that such variations and modifications be covered. The description as set forth is not intended to be exhaustive or to limit the scope of the invention. Many modifications and equivalent variations are possible in light of the above teaching without departing from the spirit and scope of the following claims. It is contemplated that the use of the present invention can involve components having different characteristics. It is intended that the scope of the present invention be defined by the claims appended hereto, giving full cognizance to equivalents in all respects.